

Multi-Use Coating for Abrasion Prevention, Wear Protection, and Lunar Dust Removal, Phase II

Completed Technology Project (2009 - 2013)



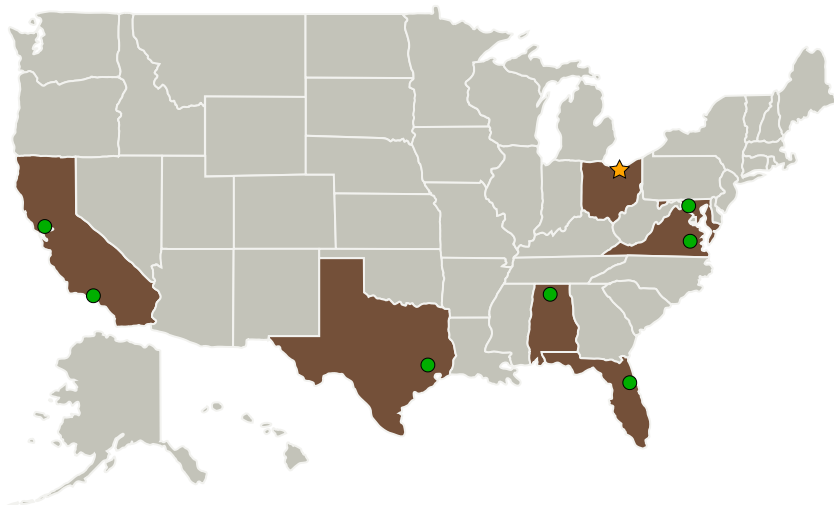
Project Introduction

The deleterious effects of lunar dust, typically less than 50 μm in diameter, have to be addressed prior to establishing a human base and long duration human presence on the surface of the moon. These effects include abrasion of seals, gaskets, motors, actuators, gimbals, bearings, blocking of optical windows, and coating of thermal control surfaces and solar panels with lunar dust. Negative physiological effects due to dust inhalation by astronauts must be mitigated. Issues related to lunar dust have been identified since the Apollo missions; however, no credible mitigation techniques have been implemented to date. The essence of this proposed activity is to develop a multi-use coating system - a highly wear resistant coating surface for use in the space environment that can also perform as part of an electrically conductive circuit upon demand to minimize wear surface abrasion and, when electrically activated, repel fine lunar dust particles from wear surfaces, sealing surfaces, and complex geometries.

Anticipated Benefits

Potential NASA Commercial Applications: Wear protection of air intakes and ventilation apparatus for heavy equipment and vehicles, and dust removal from electronics and communication equipment in combat situations. Commercial applications include prospecting equipment, communications protection, valves, bearings, and industrial dust mitigation for electronics and sealing mechanisms.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California
C&C Fabrication	Supporting Organization	Industry	
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas
● Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama
Plasma Processes, LLC	Supporting Organization	Industry Veteran-Owned Small Business (VOSB)	Huntsville, Alabama
ZP Enterprises	Supporting Organization	Industry	

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Managers:Gary C Jahns
Donald A Jaworske**Principal Investigator:**

Timothy Mckechnie

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Co-Funding Partners	Type	Location
Sorlox	Industry	

Primary U.S. Work Locations	
Alabama	California
Florida	Maryland
Ohio	Texas
Virginia	

Project Transitions

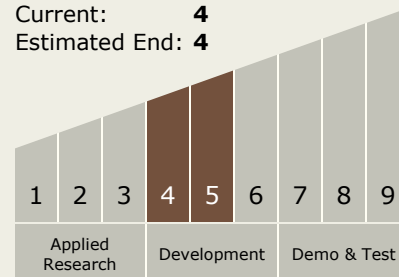
 **December 2009:** Project Start

 **March 2013:** Closed out

Closeout Summary: Multi-Use Coating for Abrasion Prevention, Wear Protection, and Lunar Dust Removal, Phase II Project Image

Technology Maturity (TRL)

Start: **5**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX07 Exploration Destination Systems
 - TX07.2 Mission Infrastructure, Sustainability, and Supportability
 - TX07.2.5 Particulate Contamination Prevention and Mitigation